BLOWOUT PREVENTER AND MOVABLE RAM BLOCK SUPPORT

~~RELATED APPLICATION~~

BACKGROUND OF THE INVENTION

Field Of The Invention

1. This present invention is directed to blowout preventers, to bonnets and ram blocks for them, and, in certain particular aspects, to pivotal ram block supports, and methods of their use.

Description of Related Art

2. The prior art discloses a wide variety of blowout preventers and blowout preventer bonnets.

3. Typical blowout preventers have selectively actuatable rams in oppositely disposed bonnets secured to the body which, in certain prior art systems, are movably secured with movable bars or with hinges and bolts so that the bonnet is movable for access and maintenance. The rams are either pipe rams (to contact, engage, and encompass pipe and/or tools to seal a wellbore) or shear rams (to contact and physically shear a pipe or tool in a wellbore). Rams are usually positioned opposite each other on either side of a main body and can seal against each other at a center of the main body over a center of a wellbore.

4. Typical rams include a ram block on which parts, e.g. seals and/or cutting blades, are releasably secured. Such seals can be subject to high pressures and to chemical reaction with drilling fluids which can damage the seals. Often rams are inspected or changed out. Prior art systems include a variety of movable bonnets for accessing rams and seals. Blowout preventers are disclosed in many U.S. Patents, including, but not limited to, U.S. Patents 3,946,806; 4,043,389; 4,313,496; 4,132,267, 4,558,842; 4,969,390; 4,492,359; 4,504,037; 2,752,119; 3,272,222; 3,744,749;

4,253,638; 4,523,639; 5,025,708; 5,056,418; 5,400,857; 5,575,452; 5,655,745; and 5,918,851.

5. There has long been a need, recognized by the present inventors for a blowout preventer with easy access to a ram block in a bonnet and for easily moving such a ram block to a position at which it can be inspected and/or replaced.

6. There has long been a need, recognized by the present inventor for easy access to sets of rams (lower and/or upper) of a blowout preventer.

BRIEF SUMMARY OF THE ~~PRESENT~~ INVENTION

7. In one aspect, the present invention discloses a blowout preventer with a movable ram block support connected to a side of a blowout preventer. In one aspect, the present invention discloses a blowout preventer with a body with a top, a bottom, and a bore therethrough from the top to the bottom; ram apparatus movable within the body, the ram apparatus including a ram block; and ram block holding apparatus pivotably secured exteriorly to the body, e.g., to a main body of the blowout preventer or to a door or bonnet, the ram block holding apparatus pivotable for selectively engaging and supporting the ram block and moving the ram block with respect to the body.

8. In one aspect a blowout preventer according to the present invention has a ram block holder pivotably connected to an exterior (to a bonnet or to a part of a main body of a blowout preventer) and positioned so that part of it can be moved to be received in a recess or groove of a ram block. Once the ram block is secured on the ram holder, by pivoting the ram block holder, the ram block can be moved away from the main body and from a corresponding bonnet that initially contains the ram block.

9. In certain aspects the ram block holder is movable toward the ram block and into a supporting position with respect to the ram block. The ram block can remain on the ram block holder for

invention have been broadly described so that the detailed descriptions that follow may be better understood, and in order that the contributions of this invention to the arts may be better appreciated. There are, of course, additional aspects of the invention described below and which may be included in the subject matter of the claims to this invention. Those skilled in the art who have the benefit of this invention, its teachings, and suggestions will appreciate that the conceptions of this disclosure may be used as a creative basis for designing other structures, methods and systems for carrying out and practicing the present invention. The claims of this invention are to be read to include any legally equivalent devices or methods which do not depart from the spirit and scope of the present invention.

18. The present invention recognizes and addresses the previously-mentioned problems and long-felt needs and provides a solution to those problems and a satisfactory meeting of those needs in its various possible embodiments and equivalents thereof. To one of skill in this art who has the benefits of this invention's realizations, teachings, disclosures, and suggestions, other purposes and advantages will be appreciated from the following description of certain preferred embodiments, given for the purpose of disclosure, when taken in conjunction with the accompanying drawings. The detail in these descriptions is not intended to thwart this patent's object to claim this invention no matter how others may later disguise it by variations in form, changes, or additions of further improvements.

BRIEF DESCRIPTION OF SEVERAL VIEWS OF THE DRAWINGS

19. A more particular description of embodiments of the invention briefly summarized above may be had by references to the embodiments which are shown in the drawings which form a part of this specification. These drawings illustrate certain preferred embodiments and are not to be used to improperly limit the scope of

the invention which may have other equally effective or legally equivalent embodiments.

20. Fig. 1A is a perspective view of a blowout preventer according to the present invention. Fig. 1B is an enlargement of part of the blowout preventer of Fig. 1A. Fig. 1C is a partially cut-away view of the blowout preventer of Fig. 1A.

21. Fig. 2 is a perspective view of part of the blowout preventer of Fig. 1.

22. Figs. 3A - 3C are perspective views which show the operation of ram block manipulation apparatus of a blowout preventer of Fig. 1.

23. Fig. 4 is a perspective view of a blowout preventer with an articulable ram block support according to the present invention.

24. Fig. 5A is a perspective view of a lock bar according to the present invention. Fig. 5B is a side view in cross-section of Fig. 5A. Fig. 5C is a side view of a lock bar pair according to the present invention.

DETAILED DESCRIPTION OF THE INVENTION ~~EMBODIMENTS PREFERRED AT THE TIME OF FILING FOR THIS PATENT~~

25. As shown in Figs. 1A - 1C a blowout preventer 10 according to the present invention has a main body 12 with a bore 14 therethrough from top to bottom, side outlets 15, and a lower flange 13 for releasably connecting the blowout preventer 10 to other apparatus, e.g. in a wellhead installation.

26. The blowout preventer 10 has opposed ram apparatuses 20 each with its respective actuator apparatus 22 within a bonnet 24. Each ram apparatus 20 includes a typical ram block 30 with seals 26. Below the bonnets 24 are dual opposed bonnets 28 each housing rams (not shown) and associated actuator apparatuses.

27. It is within the scope of the present invention for the bonnets 24 to be movably connected to the main body 12 in any

ABSTRACT OF THE DISCLOSURE

43. A blowout preventer which, in certain aspects, has a main body and ram block holding apparatus releasably secured to and movable with respect to the main body and/or to a door or bonnet, movable ram apparatus within the body including a ram block, the ram block holding apparatus positioned for selective engagement of and support of the ram block and for moving the ram block away from the body.